

CLAIMS:

1. A method of making a steel strip by continuous casting comprising the steps of:
 - a. assembling a pair of cooled casting rolls having a nip between them and with confining closures adjacent the ends of the nip;
 - b. introducing molten low carbon steel having a total oxygen content of at least 100 ppm and a free oxygen content between 30 and 50 ppm between the pair of casting rolls to form a casting pool between the casting rolls;
 - c. counter rotating the casting rolls and solidifying the molten steel to form metal shells on the surfaces of the casting rolls with levels of oxide inclusions reflected by the total oxygen content of the molten steel to promote the formation of thin steel strip; and
 - d. forming solidified thin steel strip through the nip between the casting rolls from said solidified shells.
2. The method of making steel strip as claimed in Claim 1 wherein the molten steel in the casting pool has carbon content in the range of 0.001% to 0.1% by weight, a manganese content in the range of 0.01% to 2.0% by weight, and a silicon content in the range of 0.01% to 10% by weight.
3. The method of making steel strip as claimed in Claim 2 wherein the molten steel in the casting pool has an aluminum content on the order of 0.01% or less by weight.
4. The method of making steel strip as claimed in Claim 2 wherein: the molten steel in the casting pool has an oxygen content between 100 ppm and 250 ppm.
5. The method of making steel strip as claimed in Claim 1 wherein: the molten steel in the casting pool has an oxygen content between 100 ppm and 250 ppm.
6. The method of making steel strip as claimed in Claim 1 wherein the molten steel contains oxide inclusions comprising any one or more of MnO, SiO₂ and Al₂O₃ distributed through the steel at an inclusion density in the range 2 gm/cm³ to 4 gm/cm³.
7. The method of making steel strip as claimed in Claim 1 wherein more than a majority of the inclusions range in size between 2 and 12 microns.
8. The method of making steel strip as claimed in Claim 1 wherein the sulphur content of the molten steel is less than 0.01% by weight.
9. The method of making steel strip as claimed in Claim 1 comprising the additional steps of:

e. refining the molten steel prior to forming the casting pool by heating a steel charge and slag forming material to form molten steel covered by a slag containing silicon, manganese and calcium oxides,

f. stirring the molten steel by injecting an inert gas into molten steel to cause desulphurization, and thereafter

g. injecting oxygen to produce molten steel having the total oxygen content of greater than 100 ppm and a free oxygen content between 30 and 50 ppm.

10. The method of making steel strip as claimed in Claim 9 wherein the desulphurization reduces the sulphur content of the molten steel to less than 0.01% by weight.

11. The method of making a thin steel strip as claimed in Claim 9 wherein the solidified steel is a silicon/manganese killed steel and the inclusions comprise any one or more of MnO, SiO₂ and Al₂O₃.

12. The method of making a thin steel strip as claimed in Claim 9 wherein more than a majority of the inclusions range in size between 2 and 12 microns.

13. The method of making a steel strip as claimed in Claim 9 wherein the solidified steel has a total oxygen content in the range of 100 ppm to 250 ppm.

14. A method of making a steel strip by continuous casting comprising the steps of:

a. assembling a pair of cooled casting rolls having a nip between them and with confining closures adjacent the ends of the nip;

b. introducing molten low carbon steel having a total oxygen content of at least 70 ppm and a free oxygen content between 20 and 60 ppm between the pair of casting rolls to form a casting pool between the casting rolls;

c. counter rotating the casting rolls and solidifying the molten steel to form metal shells on the surfaces of the casting rolls with levels of oxide inclusions reflected by the total oxygen content of the molten steel to promote the formation of thin steel strip; and

d. forming solidified thin steel strip through the nip between the casting rolls from said solidified shells.

15. The method of making steel strip as claimed in Claim 14 wherein the molten steel in the casting pool has carbon content in the range of 0.001% to 0.1% by weight, a manganese content in the range of 0.01% to 2.0% by weight, and a silicon content in the range of 0.01% to 10% by weight.

16. The method of making steel strip as claimed in Claim 14 wherein the molten steel in the casting pool has an aluminum content on the order of 0.01% or less by weight.

17. The method of making steel strip as claimed in Claim 14 wherein: the molten steel in the casting pool has an oxygen content between 100 ppm and 250 ppm.

18. The method of making steel strip as claimed in Claim 14 wherein: the molten steel in the casting pool has an oxygen content between 100 ppm and 250 ppm.

19. The method of making steel strip as claimed in Claim 14 wherein the molten steel contains oxide inclusions comprising any one or more of MnO, SiO₂ and Al₂O₃ distributed through the steel at an inclusion density in the range 2 gm/cm³ to 4 gm/cm³.

20. The method of making steel strip as claimed in Claim 14 wherein more than a majority of the inclusions range in size between 2 and 12 microns.

21. The method of making steel strip as claimed in Claim 14 wherein the sulphur content of the molten steel is less than 0.01% by weight.

22. The method of making steel strip as claimed in Claim 14 comprising the additional steps of:

e. refining the molten steel prior to forming the casting pool by heating a steel charge and slag forming material to form molten steel covered by a slag containing silicon, manganese and calcium oxides,

f. stirring the molten steel by injecting an inert gas into molten steel to cause desulphurization, and thereafter

g. injecting oxygen to produce molten steel having the total oxygen content of greater than 70 ppm and a free oxygen content between 20 and 60 ppm.

23. The method of making steel strip as claimed in Claim 22 wherein the desulphurization reduces the sulphur content of the molten steel to less than 0.01% by weight.

24. The method of making a thin steel strip as claimed in Claim 22 wherein the solidified steel is a silicon/manganese killed steel and the inclusions comprise any one or more of MnO, SiO₂ and Al₂O₃.

25. The method of making a thin steel strip as claimed in Claim 22 wherein more than a majority of the inclusions range in size between 2 and 12 microns.

26. The method of making a steel strip as claimed in Claim 22 wherein the solidified steel has a total oxygen content in the range of 100 ppm to 250 ppm.